

PIC/D-99-59
18 May 1959

MEMORANDUM FOR: Deputy Director (Plans)

SUBJECT: Infra Red Electrophotography and Conductivity
in Amorphous Semiconductors and Catadioptric
Lenses

In response to Mr. Lampshire's telephone request of
15 May, further explanation of the above subjects is forwarded
as Enclosures 1 and 2.

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PIC:ACL (18 May 59)

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Distribution:

- 0 & 1 - Addressee w/encl
- 1 - Lampshire w/encl
- 1 - PIC subj. file
- 1 - PIC chrono file

Infra Red Electrophotography and Conductivity Mechanisms in
Amorphous Semiconductors

1. The two subjects are grouped in this report since they are companion project proposals from [REDACTED] Basically the techniques as outlined are similar to the Haloid Xerographic process. The plates may be made infra-red sensitive by introducing a layer of infra-red photoconductor between the metal base and the insulating photo conductive layer. In addition, an improvement of response on an electrophotographic plate is believed possible by using a phenomenon called the "hook collector." A direct quote from the proposal provides the best explanation of the "hook collector." In a photo transistor a p-n-p-n transistor is biased so that the hole of a hole-electron pair produced by a photon near one of the p-n junctions drifts through the transistor and is trapped near the other p-n junction and causes many electrons to be injected at the second junction.

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2. The direct application of this technique is that:
(a) A method to record a photographic image in an area that is so high in nuclear radiation that a normal silver emulsion would be fogged is needed, (b) Raising the speed index of a xerographic plate would make xerography more applicable to aerial photographic use, (c) Making the xerographic plate sensitive to infra-red would be valuable where this type of detector is required.

Enclosure I to PIC/D-99-59

Catadioptric Lenses

A catadioptric lens is a folded optical path system lens. It uses mirrors which have been ground to act as lenses as well as mirrors. The light path can be folded thus giving a focal length much greater than the physical length of the lens. Along with the reduction in physical size of a long focal length the catadioptric lens gives excellent resolution. Another way the catadioptric principle may be used is with a normal focal length and extremely large aperture in a light weight combination. Navy's APOL at Philadelphia is now testing a 12" f/1.55 70mm camera which resolves 90 l/mm made by "De Oulde Delft" and weighs 103 pounds. This camera employs the catadioptric principle.

Application: Either ground photography or aerial where light weight and small size lenses are desirable along with a telescopic capability.

Enclosure II to PIC/D-99-59